

PLAINTIFF'S EXHIBIT

DOW-2437

PIPING SPEC D
DATE 11-20-78
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300-LB CARBON STEEL SYSTEM

(PROCESS)

~~350~~ ^{300F} PSIG MAX. ~~350F~~ ^{300F} MAX.

500 PSIG @ 100F

ITEM	SIZE	DESCRIPTION
PIPE		
P-282	1/4 THRU 1 1/2	ASTM A-106 GR E, EX STRONG SEAMLESS STEEL PIPE.
P-273	2 THRU 14	ASTM A-106 GR B, STD WEIGHT SEAMLESS STEEL PIPE.
P-323	16 THRU 20	ASTM A-53 OR API-5L GR B, 0.375 WALL SEAMLESS OR ELEC WELD STEEL PIPE.
FITTINGS		
E=90 DEG ELL, L=45 DEG ELL, T=TEE, X=CROSS, R=REDUCER C=COUPLING, S=STUB END, U=UNION, PC=PIPE CAP		
ELT-5	1/4 THRU 1 1/2	3000-LB THREADED FORGED STEEL FITTINGS, ASTM A-105, ANSI B16.11.
R-22	1/4 THRU 1 1/2	EX STRONG STEEL SWAGED NIPPLE, ASTM A-106 OR A-53 GR B, OR ASTM A-696 GR B OR C BARSTOCK, THREADED, BEVELED, PLAIN, OR ANY COMBINATION OF ENDS.
PC-12	1/4 THRU 1 1/2	THREADED SOLID STEEL HEX BULL PLUG, ASTM A-696 GR B OR C BARSTOCK, NORRIS.
U-2	1/4 THRU 1 1/2	3000-LB THREADED FORGED STEEL UNION, ASTM A-105, AAR DIMENSIONS, STEEL TO STEEL SEAT, PETRO AAR OR VCGT 1931.
C-31	1/4 THRU 1 1/2	3000-LB FORGED STEEL THREDOLET, ASTM A-105.
C-3C	1/4 THRU 1 1/2	3000-LB THREADED FORGED STEEL COUPLING, ASTM A-105, ANSI B16.11.
ELTR-158	2 THRU 20	STD WEIGHT SEAMLESS STEEL WELDING FITTINGS, ASTM A-234 GR WPB, ANSI B16.9.
NOTE		
WELDING ELBOWS SHALL BE LONG RADIUS.		
PC-51B	2 THRU 12	STD WEIGHT SEAMLESS STEEL WELDING CAP, ASTM A-234 GR WPB, ANSI B16.9.

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ITEM	SIZE	DESCRIPTION
C-41	2 THRU 18	STD WEIGHT STEEL WELDCLET, ASTM A-105.
N-1		ALL 1/2 NPT NIPPLES USED FOR INSTRUMENT, AND TEST CONNECTIONS SHALL BE HEAVY HEX BAR STOCK WITH A MINIMUM WALL THICKNESS OF 0.151 INCH, (0.400 I.D.).
FLANGES		
F-4-RF	1/2 THRU 24	300-LB RAISED FACE SLIP-ON FLANGE, ASTM A-105, ANSI B16.5.
F-5-RF	1/2 THRU 24	300-LB RAISED FACE WELDING NECK FLANGE, ASTM A-105, ANSI B16.5, BORE TO MATCH PIPE.
F-7-RF	1/2 THRU 24	300-LB RAISED FACE BLIND FLANGE, ASTM A-105, ANSI B16.5.
N-66A		REDUCING FLANGES SHALL BE SLIP-ON TYPE.
BRANCH CONNECTIONS		
BC-2S		FOR THREADED PIPING, USE STRAIGHT SIZE OR REDUCING TEE. WHEN BRANCH IS SMALLER THAN HEADER, A NIPPLE AND REDUCING COUPLING OR SWAGED NIPPLE MAY BE USED.
BC-58W	2 THRU 20	FOR WELDED PIPING, USE STRAIGHT SIZE OR REDUCING TEE. WELDCLET OR REINFORCING PAD MAY BE USED IN PLACE OF REDUCING TEE WHEN BRANCH IS SMALLER THAN HEADER. FOR THREADED BRANCH CONNECTION, USE 3000-LB FULL COUPLING, THREDCLET, OR NIPPLET WELDED TO HEADER.
GASKETS		
G-24	1/2 THRU 20	SPIRAL-WOUND, 316 STAINLESS STEEL-ASBESTOS GASKET, FLEXITALLIC CG, GARLOCK CR, LAMONS WR, JM-913 OR STERLING GR.
JOINT COMPOUND		
JC-15		TEFLON TAPE 1/2 INCH BY 3 MIL THICKNESS.
FLANGE BOLTS		
B-A193B7Q	1/2 THRU 20	ASTM A-193 GR B7 LIQUID QUENCHED AND TEMPERED ALLOY STEEL STUD BOLTS WITH ASTM A-194 GR 2H HEAVY HEX NUTS.

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ITEM	SIZE	DESCRIPTION
BOLT LUBRICANT		
BL-5		JET-LUBE SS-30 COPPER ANTI-SEIZE COMPOUND.
VALVES		
V-367	1/2 THRU 1 1/2	800-LB SCREWED OS/Y SOLID WEDGE <u>GATE</u> VALVE, CARBON STEEL BODY, 13 CHROME ALLOY STEEL TRIM WITH HARD-FACED SEAT RINGS, BOLTED BONNET. BONNEY FORGE HL113/F HANCOCK 950S JENKINS 8800 LUNK 1111-W RPEC F560E SMITH 800 TRIANGLE 8522V VELAN S-20548-02TY VOGT 12111
V-618	1 THRU 3	300-LB FLANGED, OS/Y SOLID WEDGE <u>GATE</u> VALVE, CARBON STEEL BODY, 13 CHROME ALLOY STEEL TRIM, HARD-FACED SEATS. BONNEY FORGE HL3-113 HANCOCK 950-F-30 JENKINS 8830 LUNK 1105-W SMITH 830 VELAN 10548-02TY VOGT 363
V-93	4 THRU 20	300-LB FLANGED OS/Y WEDGE <u>GATE</u> VALVE, CARBON STEEL BODY, 13 CHROME ALLOY STEEL TRIM WITH STELLITED SEAT RINGS. CRANE 33-XU JENKINS 101028 KITZ 300SCLS MALBRANQUE 133AXS NEWCO (VITAS) 13F-CB2 PACIFIC 350-U POWELL 3003-P140 SELLA 1121-F-2 TRIANGLE 3822V VOGT 8078 WALWORTH 5206-F-UT
V-104	1/2 THRU 1 1/2	600-LB SCREWED OS/Y <u>GLOBE</u> VALVE, CARBON STEEL BODY, 13 CHROME ALLOY STEEL TRIM WITH HARD-FACED SEAT, BOLTED BONNET.

ITEM	SIZE	DESCRIPTION
		BONNEY FORGE HL313/F HANCOCK 5500-S JENKINS 8G80 LUNK 1711-W RP&C F80DE SMITH G80 TRIANGLE 8712V VELAN S-20748-02TY VOGT 12141
V-5172	1 THRU 4	300-LB FLANGED <u>PLUG</u> VALVE, CAST STEEL BODY, 316 SS PLUG, WRENCH OPERATED.
V-91	2 THRU 8	300-LB FLANGED OS/Y <u>GLOBE</u> VALVE, CARBON STEEL BODY, 13 CHROME ALLOY STEEL TRIM, BOLTED BONNET. CRANE 151X FSVC 2503.1AS JENKINS 1042-B2 KITZ 300SCJ LUNK 3032-C MALBRANQUE 533AX NEWCO (VITAS) 23F-CB1 PACIFIC 360-1 PCWELL 3031-P140 SELLA 3121-F STOCKHAM 30-GPF-1 TRIANGLE 3812 VELAN F-1748-2T VOGT 483 WALWORTH 5281-F-AA
V-409	1/4 THRU 1 1/2	1500-LB SCREWED IN-LINE <u>CHECK</u> VALVE, CARBON STEEL BODY AND PISTON, 316 STAINLESS STEEL SPRING, TEFLON SEAT. CHECK-ALL UN-3-C-T
V-90	2 THRU 8	300-LB FLANGED HORIZONTAL SWING <u>CHECK</u> VALVE, CARBON STEEL BODY, 13 CHROME ALLOY STEEL TRIM, BOLTED CAP. ANDERSON GREENWOOD CV2-30-SCM-14-17 CRANE 159X FSVC 6563.1A JENKINS 1026-B2 KITZ 300SCC LUNK 3072-C MALBRANQUE 833AX NEWCO (VITAS) 33F-CB1 PACIFIC 380-U PCWELL 3061A-P140

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		SELLA 7121-F STOCKHAM 30-SF-1 TRIANGLE 3842 VELAN F-101114C-02TY WALWORTH 5344-F-AA
V-797A	10 THRU 20	300-LB RF <u>WAFFER CHECK</u> VALVE, CARBON STEEL BODY, 316 STAINLESS STEEL DISC, METAL SEAL, INCONEL-X SPRING. ANDERSON-GREENWOOD CV1A-30-SCM-J-17 GULF MB30-2047XR MISSION K30SPF-233
*V-665B	1/2 THRU 1	500-LB SCREWED CARBON STEEL <u>BALL</u> VALVE WITH STAINLESS STEEL BALL, TEFLON SEATS AND SEALS, 1" AND UNDER SHALL HAVE ROUND OR OVAL HANDLE, 1 1/4" AND OVER LEVER OPERATOR. X 300F MAXIMUM ALLOWABLE TEMPERATURE. CLAYTON MARK 880TTC CONTRD C-6BC HILLS MC C F602-CS-T-S6 HILLS MC C M502-CS-T-S6 JAMESBURY A22-33-TT (T/W) JENKINS 8421 LUNK 729XLT PACIFIC CS-325-12P5 SMITH 411TER WALWORTH S-4212
*V-743B	1/2 THRU 6	300-LB FLANGED STEEL <u>BALL</u> VALVE WITH 316 STAINLESS STEEL BALL, REINF TEFLON SEATS AND TEFLON SEALS, 1" AND UNDER SHALL HAVE ROUND OR OVAL HANDLE, 1 1/4" AND OVER LEVER OPERATOR. X 350F MAXIMUM ALLOWABLE TEMPERATURE CONTRD C-1688-BC HILLS MC C S301-CS-R-S6 JAMESBURY D-300F-22-36-MT LUNK 714RT KTM E0862-32-DT-30-L MARPAK CS-300-12-RT SMITH 430 GB WALWORTH S-41E0F KWM B120-CS-02-S1
V-SP300	6	300-LB FLANGED OS/Y CARBON STEEL <u>BALL</u> VALVE, REGULAR PORT. ORBIT 1233H
V-813 727	1/2 THRU 3	300-LB FLANGED <u>3-WAY</u> , 2-PORT 90 DEGREE

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ITEM	SIZE	DESCRIPTION
		TURN, TEFLON SLEEVED, TRANSFLOW PLUG VALVE. CARBON STEEL BODY, DUCTILE IRON PLUG, 45 DEGREE OFF-SET LEVER OPERATOR. DURCO MG431-1-CSNI 45 OFFSET TUFLINE 0337AX-CS-CI 45 OFFSET

V- 8156 9276	4 THRU 10	300-LB FLANGED 3-WAY, 2-PORT 90 DEGREE TURN, TEFLON SLEEVED, TRANSFLOW PLUG VALVE. CARBON STEEL BODY, DUCTILE IRON PLUG, WEATHERPROOF GEAR OPERATOR. DURCO MG431H-1-CSNI TUFLINE 0337EG-AX-CS-DI
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NOTE ALL PIPING ONE-INCH AND UNDER MAY BE BENT PIPE
INSTEAD OF STRAIGHT RUNS WITH SCREWED ELBOWS.
PIPE BENDS SHALL HAVE A RADIUS OF NOT LESS
THAN FIVE NOMINAL PIPE DIAMETERS AND SHALL BE
FREE FROM KINKS, RIPPLES OR FLATS.

N-213 PIPING SHALL BE INSTALLED IN ACCORDANCE
WITH ENGR SPEC 47-110.

N-100 INSTRUMENTATION

N-101 THE FOLLOWING SPECIFICATIONS ARE TO BE USED
FOR INSTRUMENTATION. FOR ITEMS NOT LISTED,
THE PRECEDING PIPING SPECIFICATION IS TO BE
USED WHERE APPLICABLE.

PIPE

P-105	1/4 THRU 1/2	ASTM B-165 ANNEALED MONEL SEAMLESS TUBING, 1/4 OD, 3/8 OD OR 1/2 OD BY 0.035 WALL, AS SPECIFIED.
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FITTINGS

E=90 DEG ELL, L=45 DEG ELL, T=TEE, X=CROSS, R=REDUCER
C=COUPLING, S=STUB END, U=UNION, PC=PIPE CAP

ELTR-105 MONEL SWAGELCK TUBING FITTINGS.

FLANGES

F-603	1/4 THRU 1/2	500-LB SOCKET WELD TWO HOLE FLANGE. VOGT SW330 OR EQUAL
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VALVES

V-699	1/4	3000-LB NEEDLE VALVE, 316 STAINLESS BODY.
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ITEM	SIZE	DESCRIPTION
		TEFLON PACKING, 1/4 INCH MALE PIPE THREAD BY 1/4 INCH SWAGELOK ENDS. WHITEY 1VM4-S4-J16
V-712	1/4	300-LB SCREWED HCRIZONTAL LIFT CHECK VALVE, J16 STAINLESS STEEL, BOLTED CAP. ALOYCO 2550-CF8M COOPER 330 SELC NEWCO (WADA) 43T-F34 PACIFIC S-3381-12 POWELL 2004A VOGT 701 F8M

* ASTERISK BEFORE VALVE NUMBER INDICATES
RESTRICTED VENDOR LIST.

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